Techniques and Considerations for Native Plant Seed Collection

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Abstract

My first goal is to open a discussion of the ecological, economic and political considerations involved in native seed collection in the western United States at the dawn of the 21st century. My second is to pass on some of the most important practical seed collecting techniques I have developed over the past 18 years. I first discuss ecological impacts of seed collection based on my own observations and propose some simple seed collecting rules. I discuss the economics of native seed collection from a small business perspective. The most dramatic changes in native seed collection may come from political responses to emerging problems, both real and imagined. A recent Forest Service moratorium on the seed collection of five native species is a good example. I propose an alternative approach to current rules and moratoriums.

Key words

Rules, Ecological, Economic, Political, Identification, Cleaning, Germination

Introduction

When I started gathering wildflower and grass seeds in the mountains and deserts of central Idaho almost 20 years ago, I was alone. As far as I could tell, I was the only person professionally collecting native seeds in my area. I wandered around for years. I began the task of identifying all the plants in their dried, seed-producing form. I began to recognize patterns in bloom sequences. I learned how to lengthen my collecting season by moving up and down in elevation.

Proceedings of the Conference: Native Plant Propagation and Restoration Strategies. Haase, D.L. and R. Rose, editors. Nursery Technology Cooperative and Western Forestry and Conservation Association. December 1 2-13, 2001. Eugene, OR.

Over the years I began to see an increasing interest in native seed collection. The West became the fastest growing area of the country. The demand for native landscapes, especially around trophy homes began to explode. Beautiful color pictures of wildflowers and native grasses began to grace the pages of popular gardening magazines. Federal agencies showed an increased awareness in using native plant materials to combat large-scale devastation due to noxious weeds and wild fires. Cities from Denver, Colorado to Park City, Utah recognized the problems associated with unlimited residential growth combined with finite supplies of water. They embraced xeriscaping and encouraged the use of drought-tolerant, native plants. Native plant nurseries sprouted all over the West. And now, this conference itself becomes evidence of a new level of popularity for native seed collection.

As our young human culture in the West grows and matures, and we continue to learn more intelligent and elegant ways to interface with the natural environment, several ideas become clear. Demand for native seeds continues to outstrip supply for projects and experiments. A nearly unlimited potential supply of native seeds is represented in our millions of acres of public lands. Yet before we unleash masses of new native seed collectors on public or private lands, we need now more than ever to consider the impacts. We need to share our experiences. We need to share our techniques.

Ecological Considerations

Many years will pass before we have a reasoned and detailed idea of the impact of native seed collection upon our environment. It is part of what I have come to call a "complex biological problem." Even if the impacts of the sustained removal of large quantities of seeds from individual areas are scientifically documented, generalizations to other areas, even short distances away, will be hard to justify. Too many variables exist. However, several observations come to mind as we approach this important problem.

My own experience leads me to believe native seeds can be collected in relatively large quantities without noticeable negative effects to existing plant communities. Generally, most species produce an overwhelming surplus of seeds when compared to the carrying capacity of the surrounding environment. This is especially true in the arid west. The amount of biomass removed is relatively insignificant. Even in the most well-timed and efficient seed collecting operations, most seeds spill to the ground or fly into the air before they can be collected.

The impact of native *seed* collection on animal communities needs to be taken into consideration. Documentation about animal survival dependent upon different seed crops needs to be collected and published for the native seed collecting community.

In my experience, the benefits of collecting native seeds close to where they are planted outweighs the possible negative consequences. We have seen our most successful projects result from native seed collection on or near the project site. With millions of acres of disturbed public lands in the West in need of long-term management for ecological health, reconsidering all areas for careful, controlled native seed collection may be necessary. Many wilderness areas, wildlife refuges, research natural areas and national parks are off limits to native seed collecting. Yet these areas may represent some of the only sources for needed native seed supplies. In addition, many areas off limits to seed collecting are still being grazed by cows and sheep. In these cases, seeds can be harvested with little or no additional impact. New grazing rules could allow both seed collecting and grazing to be optimized.

Seed collecting rules

Seed collection, especially in sensitive areas as proposed above should not be done without rules. I am sure much discussion will take place before detailed rules are developed and widely accepted. Over the years, I developed a few of my own seed collecting rules.

Collect the seeds from no more than one-third of the plants in a population.

If only a few plants grow in a given area, don't take more than one-third of the seeds from any one plant.

Never disturb single displays or plants identified as sensitive or endangered.

If you are unsure of a plant's status, check with the nearest native plant society.

Always get the permission of the landowner, public or private.

Emphasize your interest in sustainable seed collection.

Economic Considerations

As the West runs out of water in relation to its swelling human population, and environmental awareness continues to expand, drought-tolerant, native landscaping itself represents a potentially new multi-million dollar industry. Coupled with increased government agency interest in the use of native plant materials on public lands, native seed collection is sure to be on the verge of economic explosion.

The native seed collecting community should continually question how this industry develops. If the economic practice of native seed collection is to be truly sustainable and environmentally sensitive, it should remain in the hands of relatively small, independent, regionally located businesses, exchanges and agencies. Ecological diversity dictates this. The most elegant model is one with each area having its own small seed company, seed exchange or seed agency supplying seeds, knowledge and rules adapted to each individual region. Paul Hawkin summarized this once when he said:

"You can't run elegant systems from command central."

Unfortunately, our current economic system rewards economic size at the expense of local environments. And many times our federal and state agencies default to practices and contracts favoring larger entities. I suspect those involved in this community of native seed collectors, and I strongly recommend we call ourselves a community, are at least a bit more environmentally sensitive than most. We should unite and use all the new tools to try to create a new economic and environmental model for this industry. Shared on-line seed exchanges and coops should be explored. A sustainable seed trade association was discussed a few years ago at the Eco Farm conference in California and needs to be created. Most of all, we should be aware of the fact that we will all have to work hard, together, if we want this to be a healthy industry. We must not forget what the status quo will bring.

Political Considerations

The most dramatic changes still to come in native seed collection may be political. The federal government's plan to charge "wholesale market value" for seeds collected on public lands and the recent moratorium on the collection of certain plants needs to be discussed in terms of an overall plan to provide enough seed and promote a sustainable new industry.

As part of a congressional move to find new funding sources for our public lands, the Forest Service has recently been allowed to create a *fee* system for a new category called "special forest products". Botanists in region 4 and 5 are now drawing up plans to allow local ranger districts to implement rules and charge fees for the professional collection of forest materials like seeds and mushrooms. Variation in rules among the different districts is a healthy development, but unless experienced local seed collectors get involved in the process in each district, the rules and prices adopted will not always be intelligent. Now is the time for us all to get to know our local forest ranger.

Because of a perceived threat last year to 5 different native medicinal plants, a moratorium was implemented in regions 4 and 5 of the US Forest Service. The collection of any part of these plants was banned completely. This approach has problems. In some areas inside regions 4 and 5, these plants were not threatened. And furthermore, the moratorium did not address the careful collection of seeds to allow commercial production of these plants, surly the only way to effectively lessen the pressure to collect them in the first place. Input from local individuals spread throughout the region would make regional rulings like this more difficult.

Collection Techniques

Native seed collection is not especially mysterious or difficult. Probing, poking, shaking, and crushing unfamiliar dried pods and capsules can lead to new challenges and satisfying successes. With few exceptions all flowers by definition produce seeds that can be harvested. However, collecting them efficiently from each different plant species is a complicated question. Each genera and species represent unique sets of problems. Given the limits of this forum, some approaches and techniques are worth mentioning.

Identification

Of primary importance to a native seed collector is proper plant identification. Most native seeds are worthless commercially unless they can be properly identified to the species level. Unfortunately for new seed collectors, most flower guides describe and picture plants during flowering stage, long before seeds are mature enough to be collected. I offer the following suggestions.

- Taxonomy guides like *Flora of the Pacific Northwest* and *Intermountain Flora* do contain line drawings of seeds and their containment vessels. If you are going to study before entering the field, look first at the differences at the family level. Generally, plant families have similar seed producing systems. Once you recognize the families, you can proceed to finer distinctions.
- Take trips to seed collecting areas while flowers are blooming and plants are identifiable. Sometimes marking particularly promising stands while in bloom with a piece of string will pay large dividends later when seeds are ready.
- If you stumble across a plant gone to seed that interests you, don't leave it behind just because it can't be identified. Search the immediate area for different members of the same species still flowering-fortunately, this is a common occurrence. In some cases, seeds dried and ready to be collected can be found next to flower buds just beginning to open.
- In the mountains, you'll find wildflower seeds dried and ready to be collected at lower elevations, while the same plant blooms higher up the mountain. A seed collector can, in effect, move back in time by climbing to a higher elevation-and thereby solve the mystery of the plant's identity.
- Another trick used by seed collectors is to look in and around plants to find the previous year's dried stalks and seed pods. Even if the seeds have long since disappeared, important clues can be discovered as to the shape and size of the coming seed capsules.
- If you unable to identify a plant, you can always collect a few seeds and plant them at home. This allows you to observe all the growth stages and identify it at your leisure when it finally blooms.

Timing

Timing is important for successful wildflower collecting. Generally speaking, seeds must be harvested when ripe or dry. In extreme situations, bountiful quantities of seeds found one day completely disappear the next.

- Observe the sequence in which wildflowers bloom each year. The start date for entire sequences changes each year as spring comes early or late. Once a bloom sequence has begun, flowers bloom in the same order more or less, year after year, allowing predictions for the best seed-collecting time. For example, if lupinus is usually ready for seed collection a week after balsamorihiza, and balsamorihiza blooms two weeks later than usual, lupinus seed collection will be delayed two weeks.
- The window of opportunity for successful seed collection varies widely for different plants. A successful seed collector needs to learn these differences. For example: geranium and arnica flowers can be collected early, even while blooming. The flowers mature later into viable seeds when allowed to dry in a paper bag. Lupinus seeds however, must be collected dry in the pods on the plants in order to be viable. Early collection while the pods are green and flowers persist is a mistake.

Cleaning

Generally, clean seeds sell for more. Beginners have two choices. They can take the time to collect seeds as clean as possible in the field or learn to clean seeds later. Fortunately, simple, inexpensive seed cleaning equipment is widely available.

- A little extra time taken in the field sometimes saves tremendous amounts of time later when trying to clean seeds. This is especially true when dry *seed* stalks can be bent and literally poured into your bags. Some of my favorites include members of the lily family such as xerophyllum, camassia and calochortus. Aster family seeds with a pappus are almost impossible to separate from chaff once collected. I now take the time to carefully pick the parachutes of ripe arnica, aster and erigeron.
- Cleaning screens offer one of the most simple and inexpensive seed cleaning methods. A set of cleaning screens will have differ in the size of the openings which are used to separate seeds from chaff. The screen number denotes the number of openings that will cover one-inch. A screen is selected with openings just large enough to let seeds drop through without the chaff or as in the case of larger seeds, a screen is selected to allow the chaff to drop through without the seeds. I use screen sizes 10, 12, 16, 20 and 24 purchased at my local hardware store.
- Flailing is the process of fracturing or crushing seed pods in order to free the seeds. This can take the form of everything from simply rubbing mustard pods between your hands to driving over sweet pea vines with a car.
- Winnowing is an ancient technique used to clean seeds-moving air from a fan or breeze is used to separate heavier seeds from lighter chaff.

Germination testing

The application of Federal and State seed laws to numerous new, untested families, genera and species of native plants is problematic for most state seed labs. Different requirements are emerging from different states, and many states have no requirements for natives. Check with your local state seed lab to see if germination standards have been established for the natives you will be collecting.

Tetrazolium (TZ) testing has emerged as an alternative germination test. This is important for native seeds because it tests for viability without having to break dormancy. The test is allowed in Idaho and some other states and is quite easy to perform on your own. Check with your local seed lab. Tetrazolium is widely available at local pharmacies. Seeds are tested by soaking them, cutting them in half and then applying the TZ. Each living seed stains the TZ blue. You can get a copy of the Tetrazolium Testing Handbook, #99, 1999, from the Association of Official Seed Analysts, aosaoffice@earthlink.net.

Labeling

As State Seed Labs begin to digest the complexities of native plants for the first time, new labeling procedures are beginning to emerge. Many western states now have an alternative wildland collected site identification tag to substitute for the certified seed tags traditionally used for commercial seed crops. Again, you should check with your state seed lab for exact requirements.

I always keep detailed records about each seed-collecting trip and each seed sample. I carry small zip-lock plastic bags, an indelible-ink pen, and a notebook. I put each seed sample in its own bag and label it with the following information: species name, common name, date; location, elevation, surrounding vegetation, slope angle, soil description, sun exposure, time it took to collect, estimated number of plants in the area and any other relevant comments.

Conclusion

Collecting native seeds is an amazing, interesting and wondrous activity. If you think for a moment, seeds are living embryos. They represent life in its most diverse, durable and condensed form. Each seed contains countless years of evolutionary feedback as well as instructions for potentially unlimited self-reproduction. Seeds are software and hardware rolled into a package so tight, so efficient and so elegant, nothing we humans have developed comes close.

Our remaining native seed stocks deserve a community of native seed collectors which will share its concerns and techniques, one continually questioning its place in the ecology, economy and community of this fragile world, one that knows we must come together to survive.

Literature Cited

McDorman, Bill. 1994. Basic Seed Saving. International Seed Saving Institute, Idaho